GARDEN AND FOREST.

PUBLISHED WEEKLY BY

THE GARDEN AND FOREST PUBLISHING CO.

OFFICE: TRIBUNE BUILDING, NEW YORK.

Conducted by . . . . . Professor C. S. SARGENT.

ENTERED AS SECOND CLASS MATTER AT THE POST OFFICE AT NEW YORK, N. Y.

NEW YORK, WEDNESDAY, AUGUST 27, 1890.

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Growth in Thought Relating to Forestry Matters.

THE principal gain in relation to matters connected with forestry and the preservation of scenery in this country in the last two or three years is probably the increasing definiteness of thought regarding them. More persons comprehend the truth that if anything is to be accomplished in the way of improvement in the condition of these interests much work will be required, and some money must be expended. There are new organizations and activities for the promotion of such objects in this state, in Massachusetts, New Hampshire and Maine, and their influence, in conjunction with the increasing discussion of these subjects by the press of the country, has led to a perceptible advance in public thought. There is increased clearness, definiteness and sobriety, and less hazy enthusiasm and fantastic talk. The new temper is more favorable to action than the old, although there is still room for much improvement in all these respects.

Meetings, addresses and essays have their place and are often highly useful, though more is usually expected from them than they are really suited to accomplish. They are good only if they lead to something beyond themselves, to intelligent and systematic endeavor to change the condition of the public mind and the course of public action in relation to the particular matter which requires improvement. Unless orderly and persistent work of this kind is contemplated, and is actually provided for and taken up in action adapted to bring in a new order of things, it would often be better not to start a new movement or publish resolutions setting forth the plan of a great reform. An abortive beginning of this kind makes all subsequent effort for similar objects more difficult, and the effect is depressing and injurious in proportion to the attention and expectation which have been awakened.

Enthusiasm is a good thing in such matters if it is of the enduring kind which sustains a man in a long course of effort to arouse public interest and enlighten and direct public sentiment. In every attempt to bring about an advance in matters pertaining to forestry interests in this country, or to scenery and public out-of-door possessions and opportunities, the greater part of the work, and much the most difficult part, is that of interesting and engaging the people in support of the proposed measures of improvement. The question of means and methods for the diffusion of knowledge and the propagation of ideas is what chiefly requires attention. The difficulty of work of this kind, and the amount of it which will be necessary, are nearly always underrated by those who plan new movements. In many instances this part of the work seems to be left out of sight altogether, and its necessity is not recognized. Apparently, it is expected that the existing order of things will be entirely changed by the adoption of resolutions and the election of a board of officers.

But the best possible beginning avails little unless it is followed by a new course of action. If anything valuable is to be accomplished new centres of energy must be established and new activities must be set up. To bring about any considerable improvement in the situation of the interests connected with the forests or with scenery, in any of the states of this country, much conference and correspondence would be required in order to bring the people who are interested in such objects into relation with each other, and thus render effective co-operation possible. It is important in any effort of the kind not to undertake too much at first. After a definite purpose is outlined which can be commended to the public as moderate, reasonable and desirable, the main idea must be developed, patiently and clearly, and its relations to existing conditions and interests fully set forth. Few persons will attend or heed at first, and prejudices and prepossessions of all kinds have to be overcome. It requires time and much iteration of impressions to change habits of thought and action. There is little chance for the success of such undertakings unless obstacles which are certain to be encountered are recognized at the beginning. Any successful enterprise of the kind must have a business basis, and business methods must be followed so far as to provide for necessary expenditures. But many persons think themselves deeply interested in local movements for the preservation of scenery and in similar objects who never really assist in any effective way. They never reach the stage of serious or definite thinking in regard to the matter. The movements for the preservation of scenery in various states of this country afford opportunities for valuable service to the general welfare which should be most welcome to men of public spirit.

A year ago Mr. William McMillan, Superintendent of Parks in Buffalo, read a paper before the Society of American Florists, in which he argued in favor of the natural treatment of grounds which are large enough to have a distinctive landscape character as opposed to what is known as decorative treatment. That is, beds of bright colored plants were spoken of as altogether out of keeping with a picture of pastoral simplicity. Mr. McMillan pursued his argument with some raillery against staring contrasts and loud colors and the use of trees and plants with constitutional deformities instead of a more moral, quiet and delicate style of art. It was said that if the opportunity had been given to reply to Mr. McMillan his position would have been criticised by many members of the Convention, and, therefore, at one of the sessions of the Association in Boston last week the question was again brought forward with the avowed purpose of continuing the discussion. It would naturally be supposed that members of a calling whose business is primarily with flowers would favor the use of material with which they are most familiar—that is, that they would insist upon the splendors of color which can be furnished by conspicuous flower beds as an essential feature of planting. But, in truth, it seemed that the majority rather preferred the kind of art which Mr. McMillan advocated.

The fact is that the florists of the country have been doing a great deal in the way of introducing more simple and quiet arrangements. Even in cut-flower decorations the stiff and formal designs of a few years ago have been superseded by more natural grouping and more delicate shading in the colors used. Perhaps there is no real conflict between the two schools so-called, and that there is no reason why each one should not appreciate the value of the other. The statement made by Mr. Manning, of Brookline, that we must recognize two distinct arts to which the name of gardening is applied, seemed to be generally accepted. Landscape gardening deals more with the fundamental and permanent features of scenery, while decorative gardening is confined to more contracted spaces where the treatment may be highly ornamental and modified every year. Neither one of these should be adopted to the exclusion of the other, and the real question is, under what conditions landscape gardening proper is to be preferred to decorative gardening, or how far the two can be used together without conflicting so that each one would detract from the value of the other.

It will hardly be disputed that formal beds of flowers can be placed so as to disturb the quiet and unity of a meadow, and that on the other hand a stretch of green sward with its irregular border of shrubs and trees would be an inappropriate setting for a brilliant piece of carpet bedding. The fields for the exercise of good work in both directions are sufficiently numerous. There is abundant room for formal planting in connection with architectural terraces and monumental buildings, and there is no reason why persons who appreciate good work of this sort cannot relish also the broad and park-like treatment of larger public grounds. The discussion was interesting because it proved that every year there is a larger number of people who take correct views of the principles upon which both kinds of gardening should be based.

The Sacred Olive-Tree of Blidah.

A PORTRAIT of the Olive-tree in the Garden of Gethsemane was published in one of the early numbers of GARDEN AND FOREST (i., page 284). Less widely known and less interesting, certainly, to the peoples of western nations, are the sacred Olive-trees of Blidah, one of which appears in our illustration on page 419, although these trees have long been reverenced by the inhabitants of Algeria, and are familiar to travelers in that country. The sacred grove, of which our tree is one of the largest individuals, was planted, so goes the story, by the hand of a famous Marabout, who prophesied the destruction of this modern Nineveh, in the days when Blidah was known as the "wicked city," from the depravity of the rich Arabs who flocked to it to pass the summer months. The prophecy came true, for an earthquake, which lasted during four days, destroyed in 1825 the lives of 7,000 of the inhabitants of Blidah, but spared the sacred grove and the tomb of the prophet, Mohammed-el-Kebir, which it shades.

Our illustration is from an Algerian photograph placed at our disposal by Mr. Francis Skinner, of Boston.

The Arboretum of Dr. Dieck at Zoeschen.

AT the ancient Saxon city of Merseburg, built by the Emperor Henry the Fowler, one is truly in the heart of central Germany. Immense plains, unfolding themselves toward the distant hills which to west and north border the horizon with a line of blue, a rich alluvial soil traversed by the Saale and its tributaries, a whole province where spontaneous vegetation has, so to say, disappeared beneath an overlay of infinitely careful cultivation—this is the aspect of the country through which we pass on our way toward Zoeschen. Towns and villages solidly built of hewn stone breathe of comfort and give themselves the air of a German Goshen; they swarm with a well dressed population and bear the seal of an ancient civilization.

"Here is Zoeschen," says the driver, and we traverse the village, which is more exactly a little town, pretty and cleanly; and, at the end of a short street, diversified by rural-looking gardens, we enter a verdurous avenue that, making a turn, carries us along a bridge over a brook whose troubled waters show the effect of this eminently rainy summer. Another turn among great trees, dominated by an enormous Canada Poplar, and the carriage stops before the entrance of a fine modern villa, where Dr. Dieck is standing to offer us the hospitalities of his estate.

This oasis of arboriculture, in the midst of the prose of endless fields of grain, is of recent origin. It does not impress us by means of ancient trees or of magnificent perspectives losing themselves in great forests. All these there are, but in the distance. What Dr. Dieck calls the "National German Arboretum" exists as yet only in an embryonic state, although conceived on a grand scale. It has been laid out over an area of six hectares, at a half hour's distance from the house and the park, on low grounds rather too subject to the inundations of the little River Lupa, a tributary of the Saale. The trees and shrubs have been planted recently in groups, at well judged distances from each other and with regard to the natural families to which they belong. Several unfavorable seasons have but too greatly retarded their development and left wide gaps which must be refilled. Everything that the catalogues offered in the way of old acquaintances and of novelties beginning to be somewhat known has been confided to the soil, and it is proposed to add without delay the whole assortment contained in the nurseries of Zoeschen, a truly astonishing quantity. No difficulties daunt the proprietor. After three consecutive years of the most discouraging sort, he has just enriched the Arboretum with 300 new species or forms which are not mentioned in any catalogue, even his own. An old tile-factory, which adjoins the plantations, is about to be renovated, and will serve as a botanical and silvicultural laboratory.

But, after all, the Arboretum is not the greatest glory of the Zoeschen establishment, for, however grandly prepared, it is as yet a work of the future, counting for little at the present moment. While the Arboretum at Muskau, founded with such fair hopes by Petzhold, is sadly dying on its sandy hill, that at Zoeschen is but just emerging from the dampness of its alluvial soil. A future generation will admire it, but what impresses us to-day is the greatness of the idea conceived by its founder.

Present interest centres chiefly in the nurseries, which surpass those of Angers, and already rival those of Herr Spaeth, near Berlin, and which include a vast collection of species, forming an extraordinary collection of novelties, some of which are of almost fabulous rarity. Dr. Dieck has a rare energy and an inborn passion for the works of nature. He travels widely and himself collects plants, seeds and insects; where he cannot go in person he sends his agents, and he perpetually animates the pen and the industry of innumerable correspondents in fulfilling his mission to disseminate the vegetable species of the whole globe and enrich the flora of his fatherland. The word impossible does not exist for him when rare plants are to be won from foreign countries. A mere private citizen, he has established solely for his own use eight stations through central Asia from the Caucasus to the Japanese island of Yezo and into the depths of Siberia, with a branch toward the west embracing Bulgaria, Asia Minor and Mount Lebanon.

His nurseries now cover a space of 100 acres, which will soon be increased to 125 acres, as large an area as can be kept in good order. The great mass of the plantations extend beyond the Arboretum, stretching toward a vast and magnificent forest of Oaks and Lindens, Ashes and Maples, which is called "The Great Wood," and which reaches nearly to Leipsic, along the course of several little rivers. Here are great plantations of forest and avenue trees; there conifers brave a climate which is unfavorable for them, often under the protection of shutters and rushes. It is worthy of remark that the German Fir (*Abies pectinata*), the natural area of which extends as far as Lithuania, freezes here, and that the Douglas Spruce does very poorly, while certain species reputed tender seem, on the contrary, entirely hardy.

The seedling-beds of Zoeschen, which make the most astonishing feature of the place, occupy an immense space back of the park proper. A great enclosure protects them, as is likewise the case with the conifers. Here one finds also the *plantes de la terre de bruyère* of the Rhododendron class, Azaleas, Kalmias, Ilexes and other broad-leaved evergreen shrubs. It is not too much to say that this last class contains marvels, as, for example, among those most recently introduced, *Rhododendron Ungerii*, from the Caucasus, with brilliant foliage silvered beneath; *Phillyrea Vilmoriniana*, from the mountains of Pontus; *Bruckenthalia spiculiflora*, from the Bythinian Olympus; *Quercus alnifolia*, from Cyprus, which might better be called *Q. camelliæfolia*; Eleutherococcus, from the Amour

River; *Magnolia hypoleuca* and *M. parviflora*, the Japanese Stuartia, and many more, including innumerable Vacciniums and other *Ericaceæ*, which are difficult to cultivate, and which have been chiefly furnished by America.

The number of wild Roses, species or varieties, is simply startling, and of especial importance in this department are the Oil Roses. To Dr. Dieck is due the credit of having wrested the monopoly of their culture from Bulgaria. Here the queen of flowers is brought down to the level of prosaic vegetables, and cultivated not in the privacy of gardens, but side by side with Cabbages and Carrots. This new branch of agriculture seems to have a prosperous future. The product—that is, the odoriferous petals—can be advantageously sold to several large manufactories of perfumes in Leipsic. It is especially Herr Scheele, of Schadebach, near Zoeschen, who has taken in hand this new enterprise, which demands a very fertile soil or one strongly enriched and deeply trenched. He has planted vast fields, which look like vineyards, with the oil-producing Roses of the Balkan, among which *Rosa trigintipetala* seems to promise best, in spite of the attacks of a certain fungus. These Rose plantations are kept with wonderful neatness, and one seeks in vain within them for the tiniest weed. They yield annually a net return of $300 an acre, surely no mean profit. Dr. Dieck proposes to study thoroughly the Rose of Schiras, which will probably prove to be *R. moschata*, and the attar of which, he says, is the most precious of all, though as yet unknown outside of Persia.

It is surprising to see the way in which certain newly introduced American plants are growing at Zoeschen. In this respect nothing surpasses the development of *Alnus rhombifolia* and *Betula occidentalis*, natives of British Columbia—nine feet in two years and five months from sowing!

The park at Zoeschen, although not old and for the most part planted by Dr. Dieck himself, nevertheless possesses some very fine trees even, as might be expected, among very rare species. The Sophora and the Ailanthus prosper, and the Liquidambar does very well. I also remarked on a lawn near a bit of water a superb group of Glyptostrobus, that curious Chinese representative of the American Bald Cypress. These specimens are grafted on Taxodium; but this does not detract from their appearance. Furthermore, one admires here a Japanese Walnut (*Juglans Sieboldiana*) of the finest expression, and differing much in its foliage from *J. Mandschurica*. A little known Rhamnus, of the Frangula group (*R. sempervirens*), here extends its large masses of foliage, which resist the cold until Christmas. I noted *Cornus alternifolia* in the form of a little tree, which spreads its branches in the most striking way; and here I saw for the first time *Aralia spinosa* and *Panax sessilifolium* in full fruit.

But, caring even more for great trees than for rare ones, what charmed me most was a giant *Robinia Pseudacacia*, that terminates and dominates the large lawn facing the house.

Berlin. *Carl Bolle.*

[It would appear that many plants from Japan, which are comparatively rare in European gardens, have been grown for years in America. Taking those named at the head of this column for example: A specimen of *Magnolia hypoleuca*, twenty-five years old, stands within the limit of this city, while *M. parviflora* and the Stuartia have been known for years in our suburban gardens.—Ed.]

Notes on the Mexican Water Lilies.

Nature, lavish of her gifts in tropical climes, has sown in Mexican waters a larger and more pleasing variety of the flower dedicated to the water nymphs of ancient mythology than is found in our northern lakes. The species, as far as known to me, are four: *Nymphæa Mexicana*, Zucc., with yellow flowers, *N. elegans*, Hook., blue flowered, and *N. ampla*, DC., and *N. gracilis*, Zucc., with white flowers. The range of distribution of all of these, with one exception, extends within the present limits of the United States—*N. ampla*, *N. elegans* and *N. Mexicana* being known to occur in southern Texas, and the latter, if, as is strongly suspected, this species is identical with *N. flava*, in Florida also.

N. Mexicana I have traced from the lagoons of the lower Rio Grande southward to the lakes of the valley of Mexico, and westward to the slow streams of the great valley of the Lerma, in the state of Jalisco. Its leaves are six or seven inches broad on their upper surface, which is dark green and shining, sparingly splashed with purple, exactly in the way of the Florida plant; its flowers, two or three inches broad, are borne on erect stems eight to twelve inches above the leaves lying on the surface of the water, or rising out of the water when crowded; their sepals and petals are acutish, the former being purple without, but inward blending with yellow, and the petals, as also the stamens, lemon-yellow. Its rhizome is scarcely more than an inch in thickness and only a few inches in length. A striking peculiarity of this species is its multiplication by means of runners, just in the way of the Strawberry. Young plants are thus freely sent out from the rhizomes of plants formed in this way the previous year, and from the young plants themselves very often, being borne on white spongy cords half an inch thick and one or two feet long. These young plants usually flower after a few weeks, while yet attached to the parent plants. Thus the flowering of the species is prolonged from June till October.

Pleasant are memories of fields of this plant, deep green enlivened by abundant yellow blooms, seen by me in valleys lying under serene golden skies and rimmed by blue sierras.

N. elegans I take to be a denizen of the warm lowlands only, ranging from the Waco River, in Texas, southward through the Mexican Gulf state of Tamaulipas to that of Vera Cruz, at least, perhaps much farther. In the shallower lagoons of the lower Rio Grande—former channels of the river, now tortuous lakes, isolated throughout most of the year from the river's flow—it is so abundant as to cover large expanses of water.

In the size of its leaves and in the size and shape of its flowers this species is similar to the preceding, but the flower-stem is perhaps taller and more slender. The outside of the sepals is green, marked with fine broken lines of purple; the petals are of various shades of blue, while the centre of the flower, the stamens and stigma, is pale yellow. Its rhizome is as small as that of *N. Mexicana*, and it is propagated only, I think, by means of seed. Unlike those of the species just mentioned, these are very numerous and very small.

I well remember my delight when first I came upon a lake covered with this plant, whose flowers were opening in the sunshine of the morning and seemed a reflection of the blue vault bending over them.

The habitat of *Nymphæa ampla*, as well as I can judge, is more restricted. Certainly I have only met with it on or near the table-land of northern Mexico in springs here and there or in the limpid streams flowing from them. The striking peculiarity of this species, among those which are native to America, is indicated by its specific name, its leaves being a foot or more in breadth. These are purple beneath, with prominent veins. The Mexican name of such Lily-pads is *lampazos*, and they have given name to a town on the line of the Mexican National in Nuevo Leon, whose *raison d'être* upon desert mesas is a vast spring occupied by this species, and probably to a Texan town also. The flower of this species is scarcely larger than that of the preceding, its petals being white; the rhizome is somewhat thicker and longer.

Nymphæa gracilis I only know in the region drained by the Lerma, yet this is a wide region, extending from Aguas Calientes and San Luis Potosi on the north to near the City of Mexico on the east and south and to beyond Guadalajara on the west. It is the fertile and populous heart of Mexico, the region of frequent large cities and of green garden lands.

As the train of the National Railroad nears the mountain rim of the green valley of Mexico you see this Water Lily whitening the surface of the fountain lake of the Lerma, newborn from the snows of the Volcano of Toluca; and it is to be found in lakes, natural and artificial, and sluggish streams tributary to this great river far and near. Sometimes it yields place in these waters to *N. Mexicana*; but it seems to be the more common species here. The tall and slender flower-stalk rising a foot above the water, and the rather narrow and acute petals, give this plant the slender appearance indicated by its specific name. Of the several species under consideration, this one alone, as I believe, possesses any marked fragrance. Its root-stock is a tuber rather than a rhizome—or such, at least, it appears in autumn, after all the rest of the plant has perished—an ovoid body one to three inches in length, with thick and hard outer shell, covered with bosses quite like a Pine cone in appearance. In this state the plant is prepared to hibernate and endure safely the droughts of the earlier months of the year, when many of the shallow lakes which it inhabits are dried up, and the land, where they lie tumbling about on the surface, is even growing a crop of Wheat.

This strange habit of the plant would seem to favor the success of its cultivation, for its season of growth is but a few months, and when they are matured the tubers can be stored dry as well as potatoes.

Thus, as we see, two white Water Lilies, a yellow one and a blue one gladden the eyes of the botanical traveler in these interesting regions.

San Luis Potosi. *C. G. Pringle.*

Plant Note.

Pyrus arbutifolia.

THE two forms of the Choke-berry usually referred to *Pyrus arbutifolia* as varieties have been growing side by side in the Arnold Arboretum for a number of years, and display characters here which seem to make it desirable to regard them as specifically distinct. One of these plants, which must be considered the type of the species as usually limited, is reproduced in our illustration on page 417. It is the plant which Linnæus described in the "Species Plantarum" as *Mespilus arbutifolia*, and which appears to have been one of the earliest North American plants known to European botanists, as it was described by Breyne in his Prodromus of the rare plants cultivated in the gardens of Holland, published in 1678. Paul Hermann included it in his catalogue of the Leyden Garden, supplementing his descriptive phrase* by an excellent figure which exactly reproduces the plant of our illustration; and it was described again by Plukenet in the "Almagestum Botanicum," published in London in 1696†. Linnæus quotes the figure of Hermann after his descriptive phrase in the "Hortus Cliffortianus." "Mespilus inermis foliis lanceolatis crenulatis," which forms the basis of his description of *Mespilus arbutifolia* in the "Species Plantarum." It is evident, therefore, that if the species is to be divided, the plant of our illustration must be called *Pyrus arbutifolia*, and the common Black-Fruited Choke-berry, first distinguished as *Mespilus arbutifolia*, variety *nigra*, by Willdenow in his "Species Plantarum" (ii., 1021), published in 1799, *Pyrus nigra*. For Willdenow's work was published four years earlier than the Flora of Michaux, where it was first described as *Mespilus arbutifolia*, variety *melanocarpa*. Should it on further investigation be found that the two plants are varieties of one species, then the right name for this variety would be *Pyrus arbutifolia*, var. *nigra*.

Characters which appear to separate these two plants are the nature of the leaves, the flowering period, the size of the fruit, and the time of its ripening and falling.

The leaves of *Pyrus arbutifolia* are usually oblong or sometimes oblanceolate, very acute or acuminate, dull yellow-green on the upper surface and densely covered on the lower with thick, whitish tomentum, which is not deciduous. The flowers open in the Arboretum in the early days of June and the fruit does not ripen until the end of October; it is then globular or pear-shaped, and not more than a quarter of an inch across. It is bright scarlet but not lustrous, and remains on the branches without much change of color after the leaves have fallen and until late into the winter. The plants in the Arboretum have reached a height of three feet, with an upright habit of growth, and present a much less leafy appearance than those of the Black-Fruited Choke-berry.

The leaves of *Pyrus nigra* are broadly obovate, generally quite glabrous on the two surfaces even when young, although sometimes pubescent below even at maturity. They are dark green and lustrous on the upper surface, and often nearly as broad as long. The flowers appear in the Arboretum about the 20th of May, and the fruit ripens early in September. It is depressed-globular, very dark vinous purple or black and lustrous, half an inch across or often more, and falls from the branches as soon as it is ripe. The habit of this plant is denser than that of the scarlet fruited species, and is the more ornamental of the two in foliage. It varies considerably in the size and shape of the fruit, and in the size the plant attains. The form with dark, vinous red fruit usually has leaves which are pubescent on the lower surface, while the glabrous-leaved variety has larger black fruit. The fruit of both forms falls as soon as ripe—a constant and important character. The form of the leaves would not sufficiently separate these two plants specifically, but the difference in the form and color of the fruit, and especially in the length of time it remains on the branches, is so marked and constant that it is hardly possible to unite them.

Pyrus arbutifolia is less common and apparently less widely distributed than the black-fruited plant, although the two grow together in some parts of New England and southward through the Alleghany Mountains. It is not, however, common in any part of the country which I have visited.

Pyrus arbutifolia is one of the most ornamental and desirable of the hardy shrubs which, in this climate, carry bright colored fruit into the winter, and is worth a place in every garden for this character alone.

Our illustration is from a drawing made by Mr. Faxon from a plant in the Arboretum raised from seeds collected many years ago by Mr. A. H. Curtiss in the mountains of Virginia.

C. S. S.

* *Sorbus Virginiana, foliis Arbuti*, 51, t.
† *Mespilus Virginiana, Arbuti lanato folio*, 248.

New Orchids.

EPIPHRONITIS × VEITCHII.—This is a very interesting bigeneric hybrid, raised by Mr. Seden, in the establishment of Messrs. James Veitch & Sons, of Chelsea, between *Sophronitis grandiflora* and *Epidendrum radicans*, the latter being the pollen parent. It is very similar to the last named in general character, though much dwarfer, being at present but nine inches high. The flowers are also deeper in color, and borne four or five on a terminal scape. The generic name is compounded from that of the two parents. The plant was awarded a first-class Certificate and also a Botanical Certificate at a meeting of the Royal Horticultural Society on June 24th last.—*Gardeners' Chronicle*, June 28th, pp. 799, 800; July 5th, p. 20.

LÆLIO-CATTLEYA × EXIMIA.—A handsome hybrid raised by Mr. Seden for Messrs. James Veitch & Sons, between *Cattleya Warneri* and *Lælia purpurata*. The sepals and petals are lilac, of good size and substance, and the lip very large and expanded, rich purple with a lilac margin. It was awarded a first-class Certificate at a meeting of the Royal Horticultural Society on June 24th last.—*Gardeners' Chronicle*, June 28th, p. 800.

LÆLIO-CATTLEYA × CANHAMIÆ.—Exhibited by Messrs. James Veitch & Sons at a meeting of the Royal Horticultural Society on June 24th last, when it received an award of merit. It is said to be a hybrid raised between *Cattleya Mossiæ* and *Lælia purpurata* and the reverse cross of *L.-C.* × *Canhamiana*. Sepals and petals pale lilac, almost white, the lip mottled with purple.—*Gardeners' Chronicle*, June 28th, p. 800.

SARCOPODIUM GODSEFFIANUM.—This is very closely allied to *S. Dearei*, otherwise *Bulbophyllum Dearei*, though it is said to differ in habit and in some slight floral details. It was exhibited by Messrs. F. Sander & Co., of St. Albans, at a meeting of the Royal Horticultural Society on June 28th last, when it was awarded a first-class Certificate.—*Gardeners' Chronicle*, June 28th, p. 800.

MOOREA IRRORATA, Rolfe.—A striking novelty, and so distinct that a new genus has been proposed for its reception. It is allied to *Houlletia*, of which it has much the habit, but differs in various details of the lip. The flowers are borne in an erect raceme, the sepals and petals spreading, bright reddish brown, passing into nearly white at the base, thus giving a circle of paler color, which is very striking. The lip is three-lobed—the front lobe long and narrow, the side ones large and rounded, bright straw color, with radiating lines of blackish purple; in fact, it resembles a butterfly attached by its head. It flowered in the Glasnevin Botanic Garden, Dublin, under the charge of Mr. F. W. Moore.—*Gardeners' Chronicle*, July 5th, p. 7.

Kew. *R. A. Rolfe.*

Foreign Correspondence.

London Letter.

AN exhibition and conference devoted to Ferns by the Royal Horticultural Society was sufficiently supported in every way to warrant the belief that Ferns are in the ascendant with English horticulturists. Those Ferns which may be grown in the open air in England obtained the greatest share of attention, owing partly to the magnificent collections of them exhibited by the few specialists who have made hardy, and particularly British, Ferns a life-long study, and partly to the general ignorance which prevails with regard to these plants. The

exquisite beauty and grace of habit with the endless variety of form which belong to British Ferns, as represented in the best collections, astonish even experienced gardeners, who wonder how it is that such beautiful plants are not more generally grown.

English Ferns in their wild forms are charming, but the hundreds of varieties of them which have been got through cultivation, selection and hybridization are simply marvelous. Crested, crimped, contorted, made to develop characters of the most astonishing divergence from the type, these plants have so altered that it is often difficult to believe that they are mere sports due to the skill of the cultivator. Mr. Lowe, Mr. Dreury, the late Colonel Jones and Mr. Carbonnel appear to have possessed the power of obtaining almost any character they liked from a given Fern. Mr. Lowe attributes all these variations to cross fertilization, and so confident is he that Ferns cross quite freely that he professes to be able to obtain by sowing the spores of six distinct forms together a plant which will possess the combined characters of all the six!

This startling statement was almost too much for the physiological botanists, but Mr. Lowe produced his specimens of plants thus bred. On the other hand, Mr. Dreury reckons that spores of any sportive variety will produce a considerable number of widely distinct forms without the aid of cross fertilization. The Kew collection of British and other hardy Ferns contains all the best of the varieties raised by Mr. Lowe and the other specialists named. They are planted together on a large rockery and mound, where they form a most interesting feature of the garden.

Tropical Ferns, also, were exhibited in great numbers, and their merits were discussed by eminently qualified men. The horticultural papers here have since devoted much space to Ferns of all kinds. The result of this "boom" cannot but be to bring Ferns of all kinds into prominent notice. The papers read at the conference and the discussions which followed were devoted to the cultural requirements and distinctive features of the best kinds of Ferns as well as to the botanical relationships of the order. An appeal was made for simpler nomenclature, the necessity for which is seen in such names as *Polystichum angulare*, var. *divisilobum plumosum densum*, the name attached to one of the most beautiful of the hardy Ferns shown.

Fig. 52.—Pyrus arbutifolia.—See page 416.

Ivy-leaved Pelargoniums.—The great improvement recently made in this really useful section of Pelargonium by Monsieur Lemoine and others is thoroughly recognized in England, where the finest of the newer seedlings are now amongst the most popular of greenhouse plants. By crossing the old kinds with others Monsieur Lemoine obtained new breaks, which retained the loose habit and ivy-like foliage of the old forms, but instead of the small loose trusses and dull colors of the flowers which characterized them, the new seedlings have trusses as large and colors almost as varied and bright as those of the best of the Zonal section. A few days ago I saw a very fine collection of these new Ivy-leaved kinds at Chiswick, where they are exceptionally well grown, some of the specimens being quite a yard through and bearing scores of large flower trusses. The best of those noted were the following: Abel Carriere, large flowered and bright cerise in color; Bridal Wreath, white, with a few spots of rose; Charles Turner, a rich rosy carmine; De Quaterfages, large, rich red, with a tinge of violet; Madame Crousse, Madame Thibaut, Emile Lemoine, Le Printemps and Isidore Feral; these are all remarkable for the size and substance of their flowers and their clear, attractive colors. If it be true that all the Ivy-leaved Pelargoniums known in gardens are the progeny of *P. peltatum*, touched with forms of *P. zonale*, one cannot but wonder at the extraordinary improvement wrought by breeders in this one section of the genus.

Lilium Wallichianum.—The variety Superbum of this fine Indian Lily, introduced a year or two ago by Messrs. Hugh Low & Co., is much superior to the type, both in regard to vigor of constitution and the size and beauty of its flowers. It is now flowering at Kew, a bulb which last year had but one stem bearing three stems this year, each with three or four flowers, which are as large as those of the Bermuda Lily (*L. Harrisii*), but creamy white, with the inside of the tube colored canary yellow. This is the plant of which a colored plate recently appeared in *The Garden* under the name of *L. ochreleucum*, a name which used to belong to the species now known as *L. nepalense*. Hitherto *L. Wallichianum* has been known as a refractory garden plant, but the variety, at all events, has so far proved perfectly amenable to cultivation here.

Humea elegans.—A short time ago there appeared in an Australian publication a figure and notice of a form of this plant which in some part of Queensland attained a height of about twenty feet. Seeds of this variety were obtained for Kew, and from them plants were raised which are now ten feet high, and have not yet shown any disposition to bloom. By the side of them are some of the ordinary form of this plant, the two kinds having been grown together from the commencement. The latter are, however, now covered with their elegant plumes, and are nine feet high. There is a marked difference in the foliage of the two kinds, the Australian form having much broader, longer, less acuminated leaves, the base more markedly decurrent, whilst the stem is covered with a thick coat of felt-like white wool. It is possible that this may prove a new species, but whatever it may be it is certainly a very striking plant, and if it can be got to flower under cultivation in England it will be quite sensational.

Rehmannia rupestris.—This is another of Dr. Henry's discoveries in western China, and of which plants raised from seeds taken from dried specimens are now in flower at Kew. The genus Rehmannia is composed of about six species, all natives of China and Japan. It is closely related to Digitalis, but its appearance suggests Gesneraceæ rather than Scrophularineæ. One species—namely, *R. glutinosa*, generally known as *R. Chinensis*—has long been known in England as a hardy herbaceous plant. It is figured in the *Botanical Magazine, t.* 3653, and in the last number of the *Gardeners' Chronicle*, from a plant grown in a sunny border at Kew. The new one is about eighteen inches high, the central growth erect, the laterals all drooping. The leaves are large, ovate, fleshy, toothed and thickly covered with silky white hairs, giving the whole plant a silvery appearance. The flowers are not unlike those of the Foxglove in shape, and they are white, tinged with rose; they are produced singly from the axils of the leaves. Grown in pots this plant is pretty enough to please, and should it prove hardy it will be a useful acquisition as a front-row plant for the herbaceous border. Mr. Hemsley, who described this species in his "Index Floræ Sinensis," quotes Dr. Henry's note to the effect that in China this plant is known as Cliff Cabbage, and that it is much esteemed as a medical simple. It is said to grow in almost inaccessible places on the faces of cliffs. At Kew it has grown well planted in a roomy pot in rich soil.

Campanula Vidalii is one of the handsomest greenhouse plants in flower at Kew. It is quite distinct from all other garden Campanulas in its shrubby habit, the main stem developing a head of about a dozen sturdy semi-erect branches, each a foot long, and clothed with oblong, fleshy, dark green, glossy leaves, and from the end of each of these branches is pushed a long, erect spike of waxy white flowers. After once flowering the plants are done for, as they never again make good, shapely plants. Seeds are ripened freely by cultivated plants, and from these it takes three years to produce a full-sized flowering specimen. Cuttings never grow into good plants. The species is a native of the Azores, and it is figured in the *Botanical Magazine, t.* 4748.

London. *W. Watson.*

Cultural Department.

Training up an Orchard.

IT is not very difficult to prepare the land and set out 500 or 1,000 young Apple-trees. By this I do not mean that such work can be well done without much knowledge and considerable practical experience. The selection of trees from the nursery, the choice of varieties suitable to the locality and the market, the due preparation of the ground and the practical work of setting out the trees, all require knowledge and skill, for lack of which many orchards are more or less failures.

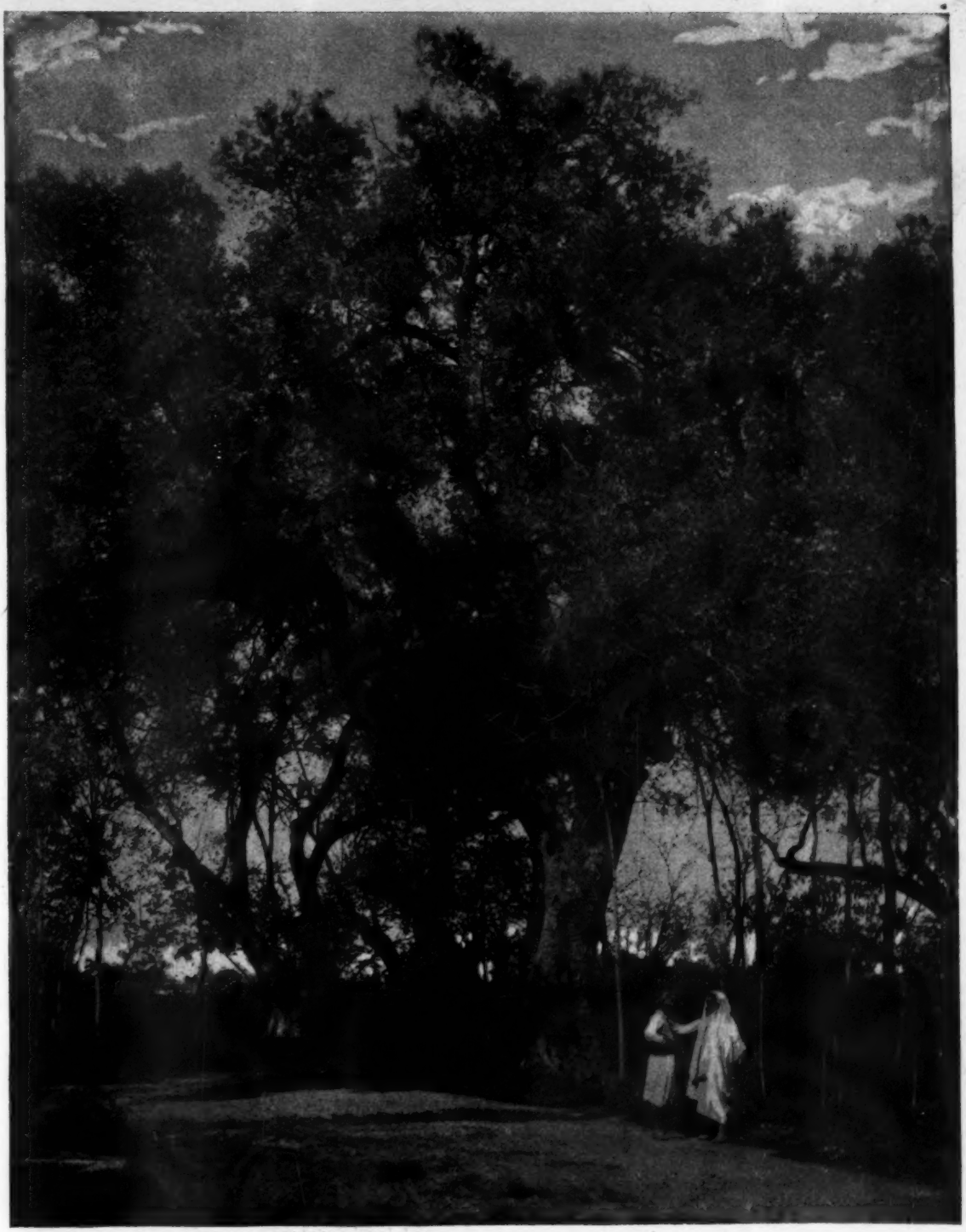
But when all of these beginnings have been well accomplished, not much more has been done toward a successful and profitable orchard than is done when we equip a son with the supposed requirements for entering college. We have a young orchard before us, and our duty is to keep each tree in the best shape and condition, so that when it begins to produce fruit it will not begin to show defects and suffer injury. Correct pruning is the first requisite of success, and it should be mainly knife-pruning—that is, a good orchardist will not allow any limbs that must finally come out to reach a large size.

One who thinks this a small undertaking will find himself mistaken. To keep an orchard properly pruned requires a well developed imagination. The orchardist must be able to see his trees in the mind's eye, as they will appear in three, six or twelve years. But to know how they will look implies a knowledge of the habits of growth of the different varieties under culture. So it might be said that an orchardist needs to spoil one orchard before he can know how to direct the growth of a second. It is only when the beginner has had the advantage of training under an expert that he will be likely to succeed at the first attempt.

The Apple has been so long under cultivation that very wide variations exist in its habits of growth. It is likely, also, that among our numerous varieties there exists considerable hybridity. We have not yet been able to produce any hybrids between the European Apple and our native species, and Professor Budd's experience seems to indicate that it will be a difficult task. But there is good reason to believe that the Apples of Europe are not all descended from a single species. Many of the recently imported varieties from Russia show remarkable distinctions from the older sorts, not only in habits of growth, but in microscopic differences in the structure of their leaves. It is being remarked, also, that they have, as a class, a more vigorous inflorescence, and that the texture of the flesh, and the flavors of these fruits, are more or less characteristic. In this country hybrids, both accidental and worked, between our old stock and the Siberian Crabs, have been produced and are in fruit in various localities.

Now all these matters affecting the habits of growth in so widely separated varieties are important to be known, before we can form a true conception of the work of pruning a young orchard and giving to each tree its proper form.

But the forming of the tree is only a single division of the task. We must know much about the habits of and means of checking and destroying the many insects, quadrupeds and birds which will interfere with our work. Unless these vermin can be promptly subjected and controlled, we may find our young trees much more than decimated at any time. Mice have been known to destroy hundreds of trees in one orchard in a single winter—gnawing the bark from the ground up into the larger limbs. There are remedies for a moderate amount of this barking by rodents, but a tree once thoroughly girdled by them is a hospital specimen forever after, no matter how skillfully treated. Bark lice come, sometimes, as though blown in clouds through an orchard, and only the most active treatment will subdue them. It is the same with the attacks of aphids, the tent and forest caterpillars, the web worms, the rank worms, and the borers. In short, the orchardist of the greatest skill and experience is many times "put to his trumps" successfully to meet emergencies and maintain the thrifty and uniform growth of his trees.



One of the Sacred Olive-Trees of Blidah.—See page 414.

All these things being successfully attended to, there are yet other matters equally important. The cultivation and fertilization of the soil of an orchard requires skill and knowledge. That the land should be first thoroughly put in condition before the trees are planted, is assumed at the start. But what shall be done with it while the trees are advancing toward the age of profitable bearing? What crops may be grown in a young orchard without injuring it, what manuring will it need and what shall be the method of tillage?

It may be set down as a positive rule that grain crops of any sort ought not to be grown in a young orchard. If a fundamental guiding principle is wanted, let it be that whatever crop is planted among fruit-trees must be one that will make its growth mainly after the trees have made theirs. In my own experience I have found Beans to be the best. They are not planted until the trees have made considerable growth, and do not draw much on the land before their terminal buds are formed. They come off early and allow of the superficial

cultivation necessary to destroy weeds. They need only shallow plowing and working, so that the roots of the trees are not much injured; and finally, the straw makes the best of all mulch for the trees, inasmuch as there is nothing in it to attract mice, it is not easily scratched about by fowls, it decays slowly, and when decayed makes a very rich dressing, as shown by the free growth of trees thus treated.

As to the amount of growth desirable in a young orchard, I think it should not be less than one foot annually, and that this must be maintained, where necessary, by a sufficient manuring. This may be either with stable-manure or any complete commercial fertilizer. Manuring sufficient to give a vigorous growth of Beans—yielding a crop of twenty bushels or more to the acre—will keep the trees growing just enough. An occasional dressing of ground bone and wood-ashes, at the rate of 1,000 pounds to the acre, always shows itself in giving vigor to the growth of the trees and a deep, healthy color to their foliage.

Newport, Vt. *T. H. Hoskins.*

Notes on American Plants.

Hydrastis Canadensis (Orange-root or Yellow Puccoon) flowers early in May, but the flowers are not showy, and they come at a season when there are plenty of others. But the foliage is fine, and it is a pretty plant when in fruit. Its height is only about a foot, and the three large cordate leaves are from five to eight inches wide, deeply several-lobed, and they remain fresh and green nearly the entire season. It is valuable for shady situations, especially when a low foliage plant is needed. It needs a light soil. It is perennial, and when once established forms a thick and permanent bed.

Silphium terebinthinaceum (Prairie Dock), which blooms about the middle of August, is a showy and stately plant, from four to eight feet high, with numerous bright yellow flowers, two or more inches wide, and large radical leaves, often eighteen inches long by a foot wide, besides the long petioles. It is a member of the Composite family, common on prairies from Michigan and Iowa south to Georgia and Louisiana. It does well in any ordinary garden soil in the sun or a thin shade. It is a near relative of the Compass-plant (*S. laciniatum*), which has once or twice divided root-leaves and similar yellow flowers, and which in favorable situations sometimes attains a height of twelve feet, and comes into flower a little before the former. Both are desirable, but need more time to become established and attain their full size than most plants.

The Climbing Hempweed or Boneset (*Mikania scandens*), which is not rare in moist places along the margins of streams and borders of ponds from New England to Texas, climbing over shrubs or anything else by which it can hold itself up, flowers about the middle of August, and is a pretty climber for such moist places. It is a herbaceous perennial belonging to the Composite family. Both the foliage and small heads of purplish flowers are handsome. It comes readily from the seed or may be transplanted.

Another member of this same order, but not a climber, and which blooms a little later, is the *Artemisia Canadensis* (Sage-bush or Mugwort). The flowers are not conspicuous or showy, but its fine and abundant silvery foliage is very handsome. When stimulated by cultivation the plant spreads out over a large space. The stems are weak and half trailing, and so numerous that a single plant will cover a space of three or four feet in diameter if given room enough and a light, rich soil in the sun.

Southwick, Mass. *F. H. Horsford.*

Rose Notes.

Rosa rugosa seems to be attracting much attention among the hybridizers of late years, and it seems reasonable to suppose that some advantages may thus be gained. The tough, strong foliage of this plant, and also its free growth, are points in its favor for hybridizing purposes, and it would therefore not be surprising if a numerous race of Rugosa hybrids should appear in the near future.

In this class is Madame Charles Frederic Worth (Schwartz), one of the recent introductions, and described as being very vigorous and perpetual flowering, flowers large, full, and well formed, and color carmine-red. If this new-comer justifies the above description it will doubtless prove a valuable addition.

Clothilde Soupert (Soupert and Notting) is a charming little Rose of the Polyantha type, flowering in corymbs which are very freely produced, and the flowers varying in color from deep rose in the centre to almost white on the outer petals. This has been largely propagated as a bedding Rose, and it is now proposed that it be grown for winter cut flowers, as its small flowers would prove very useful for "filling" in design work.

A serviceable old Rose that has been somewhat neglected of late years is Duchesse de Brabant, possibly on account of the greatly increased list of pink Roses, many of which are larger and of more perfect form than this one. Still it is a plant of good constitution and a vigorous grower, useful either for summer bedding or for winter forcing. The flowers are of medium size, nearly double, and of a very pleasing shade of pink. When the plants are making strong growth the flowers are frequently produced in clusters, though this last characteristic is not always considered an advantage.

Among the dark colored Hybrid Perpetuals, Alfred de Rougemont takes a prominent place when well grown, its large, fragrant, dark crimson flowers being admirable, and although in commerce for over a quarter of a century, it will still compare well with many of the newer sorts. This variety is also useful for forcing if not forced too early in the season, at which time it is very shy in flowering. This variety should not be confounded with Madame Alfred de Rougemont, which is a Hybrid Noisette of comparatively inferior quality.

Another of the older hybrids which should have a place in every collection of Roses is Marie Baumann, a variety of charming color and delightful fragrance. Its color may be described as carmine-crimson, or rather crimson shaded with carmine. The flowers are full and of fair size, the foliage and growth are strong and free, and altogether it possesses a combination of good qualities which it is hard to excel. Marie Baumann is also a good forcing variety, though the flowers sometimes have a finer color when grown in the open air than when under glass.

As a pillar Rose or for training along the roof of a cool conservatory, the old Noisette, Lamarque, is a first-rate variety, and when properly treated it produces immense crops of its large white flowers, while its bold foliage and strong growth are additional points in its favor. It is also an excellent stock upon which to graft Niphetos, the latter producing particularly fine flowers when thus treated; and while the grafting process may not be absolutely essential to the welfare of Niphetos, yet it certainly does appear to increase its vitality to the extent of making it produce heavy winter crops of flowers for a long series of years, at least when the stock used is Lamarque.

Very favorable reports have been given of the "Climbing Perle des Jardins," it being stated that the flowers are equal to and as freely produced as those of the type, while the growth is strong and vigorous and the foliage handsome, the distinctive feature being its scandent habit. It would therefore appear that a valuable addition had been made to the list of climbing Roses for in-door use at least, as in all probability it is no more hardy than the parent variety. Perle des Jardins sometimes endures full exposure to the winter in the vicinity of Philadelphia, but such treatment is not usually justified.

Holmesburg, Pa. *W. H. Taplin.*

The Narcissi and their Culture.

THE question is often asked whether it is necessary, or even desirable, to lift the bulbs of Narcissi annually and replant them? My reply has invariably been in the negative. Last fall circumstances necessitated the lifting of a large collection of these plants, including all the common and well known kinds, besides a quantity of choicer varieties of garden origin. Some of these were planted immediately, before the bulbs were the least dried from exposure, while others were kept in barrels and planted later. In their old quarters the bulbs had been planted three years, and we found on lifting them that those sorts which increased rapidly from offsets were really in need of lifting, as the bulbs were so crowded as to render it next to impossible for them to develop properly. This was the case with all of the Poeticus section, and others of strong constitution, such as Sir Watkin, Horsfield's and Princeps. Others, again, had not multiplied to any great extent, and, to all appearances, would have done well another three years without being disturbed. The bulbs were planted nine inches deep and covered with earth enough to bury them, and then good, well decayed manure was placed on the soil to a depth of one to two inches, and the remainder of the soil filled in. The loss from removal was small, and could be traced in most cases to a subsequent disturbance of the soil for the purpose of lifting bulbs, which brought the manure in direct contact with those left in the soil. Taken altogether, the growth this spring was not so strong as in past years, though the flowers were quite as numerous, these, of course, being formed in the bulbs previously. It may be taken for granted

that, unless clumps or beds of Narcissus have become crowded, it is by no means necessary to lift them at all, provided that, in common with all other permanent occupants of the flower-border, they receive an annual top-dressing of good manure in fall, the remains of which may be raked off very early in spring, before the leaves appear above ground.

It is surprising that one may visit so many places even among good gardens, without seeing anything like a collection of these loveliest of spring hardy bulbs. I have visited many gardens of late and have seen but one where any other than the commoner kinds were grown, and this was a trial collection; as if it had not been proved again and again that the Narcissus adapts itself readily to our eastern climate. One very important point, however, is to plant early, if imported bulbs are procured, for success the first year hinges upon a vigorous root-action before the arrival of frost. It is not too late to transplant, and this is the very best time to plant imported bulbs. It is well to be cautious with new or little known kinds when forming a collection. There are enough well tried varieties which may be relied on to do well, and which include the very best of Daffodils, such as *N. princeps*, an early kind, *N. Poeticus* and its varieties, which are always admired, and by planting with the type several varieties, such as Angustifolius, Ornatus and Recurvus these Poet's Narcissus may be had in bloom for six weeks. They flower in the order named, the type following the variety Ornatus. *N. maximus* is one of the best kinds, and reliable, being of robust habit. Horsfield's variety is to my mind the best and most distinct of all in cultivation. It forces well and is a general favorite. The varieties known as Emperor and Empress are noble kinds, but not reliably hardy.

The giant Welsh Chalice Flower, however, is perfectly hardy, has immense flowers, and is perhaps the most profitable Daffodil ever handled by the trade, owing to its rapid increase and the growing demand that keeps up the price. Where one bulb is planted three may be dug in a year's time. It is obviously a good sort to have. *N. obvallaris*, the Tenby Daffodil, with its airy appearance, is very early and also forces well. Golden Spur is a kind of recent origin; it is very large, early and of a rich yellow color. The pretty, sweet scented Jonquils, with their Rush-like leaves, should not be neglected. *N. gracilis* has similar foliage with clusters of fragrant yellow flowers, and is the latest flowering variety we have tried; it always blooms in the latter part of May and is quite hardy. Those who have a greenhouse should try the Hoop-Petticoat Narcissus. These are easily procured, flower abundantly even when forced, and are known as *N. bulbocodium*. If the soil is of a retentive nature a handful of sharp sand should be placed under each bulb when planted; this assists the young roots to push their way into the soil and acts as drainage to the bulb when at rest.

South Lancaster, Mass. *E. O. Orpet.*

The Florists' Convention.

Extracts from Papers Read.

THE annual convention of the Society of American Florists, which was held in Boston last week, attracted a larger attendance than any former meeting. The plan of omitting the afternoon session each day gave such an opportunity for social enjoyment and sight-seeing that the sessions in the morning and the evening were always well attended, the large hall in the horticultural building being filled in every instance. A resolution was passed that at future meetings the exhibitions shall be closed when the Society is in session. This will leave nothing to draw members away from the exercises and will be an additional improvement. The papers read were of a practical character, and the discussions were pointed and business-like. The local florists' club made the visiting members welcome in every way, and by arranging excursions not only in the harbor, but to such interesting places as the grounds of Mr. H. H. Hunnewell at Wellesley and Mrs. F. B. Hayes at Lexington, gave an opportunity of inspecting some of the most interesting examples of the gardener's art that could be found in the country.

The trade exhibits in the lower hall were very interesting. Mr. Chas. D. Ball, of Holmesburg, and Mr. Henry A. Dreer, of Philadelphia, Robert Craig and Edwin Lonsdale had exhibitions of their stock in trade in plants in fine health and grouped with much taste. The Messrs. Pitcher & Manda also showed a large exhibit of Cypripediums and other Orchids, including many choice hybrids and a plant of *Licuala grandis*, which is probably the best specimen of its kind in existence. The exhibits of bulbs, seeds and florists' supplies by F. R. Pierson, Joseph Breck & Sons, F. E. McAllister and others were most attractively arranged, and the display of heating apparatus and other greenhouse requisites in Bumstead Hall was unusually complete and instructive.

Abstracts of some of the more important papers are given below:

THE PRESIDENT'S ADDRESS.

The address of Mr. Jordan was largely devoted to the needs of a higher horticultural education both for the benefit of the florists and of the public. He insisted that the mission of the Society was not only to instruct members in the daily practice of their business, but to increase the general interest in horticulture and to develop a taste for it among the people. To this end all persons interested in the various departments of horticulture, as well as those engaged in researches in any science connected with it, should be invited to assist in this work.

Large fortunes have been bequeathed to religious institutions by persons who, of course, cannot foretell what may be the specific teachings of any sect a century hence. Libraries have been established and schools endowed to carry out some wish of their donors, and yet it must be acknowledged that comparatively few receive the benefit of these endowments when compared with the masses of people, young and old, rich and poor, learned and illiterate, who can take object lessons from parks and gardens. These were no doubt the sentiments which inspired Mr. Henry Shaw to bequeath his immense fortune for the purpose of instructing the people in an ever-growing knowledge of horticulture. By his will a botanical garden is given to the public with means to insure its constant and effective maintenance for the cultivation and propagation of plants and flowers, fruits and trees, together with a museum and a library devoted to the service of botany, horticulture and allied subjects. A school has already been established under the direction of Professor Trelease for young men who are to be trained in the science and art of horticulture. The income of the estate already realizes hundreds of thousands of dollars, and will soon reach the magnificent sum of $1,000,000 a year. The world can safely be challenged to show a like donation from any one individual.

Mr. Jordan also spoke of the advantages offered by the experiment stations, which are to make a regular business of discovery, to promote investigation and to diffuse the knowledge which improves horticultural practice. The United States Department of Agriculture has arranged to condense the bulletins from the various stations, and they are delivered free to all who see fit to ask for them, so that every one engaged in horticultural pursuits has it in his power to gain useful knowledge by consulting them. He counseled each member of this Society to make the acquaintance of the Director of the nearest experiment station, to furnish him with plants and trees for testing, and to report such facts as may have been learned by him in his business practice. By such an interchange of knowledge the profession will advance to a higher plane, where less drudgery will be needed and where work will be done in accordance with the established laws of science.

The speaker argued that there should be established some standard of qualification for young men entering into the employment of florists to learn the business. The time will soon come when many of our institutions of learning may graduate students prepared to become florists' apprentices. He added that suitable books should be prepared for use in schools which give instruction in the fundamental principles of horticulture, and insisted that even common schools should teach the rudiments of the art.

EXPERIENCE IN CROSSING PLANTS.

Mr. E. S. Carman, editor of the *Rural New Yorker*, read a paper recounting some of the failures he had met and the successes won in this field during seventeen years past. The record of failures is omitted here for the lack of space, although it was quite as interesting as the remainder of the paper, from which we make the following extracts:

In my practice a sharp pair of scissors, a pointed piece of wood (or even a wooden toothpick), a box for the flowers or pollen, sheets of firm tissue paper and a little strong yarn answer every purpose, so far as tools and mechanical outfit are

concerned. A camel's-hair brush is rarely of service. If pollen can be gathered in quantity, as from Rye, Roses, Honeysuckles, etc., it may be placed in boxes and applied from the point of a knife or by placing the ripe anthers themselves in contact with the receptive stigma.

In performing the operation the bud should be opened, the green anthers removed and the bud tied up in close, fine tissue paper. Open it only to apply foreign pollen to the stigmas, and at once again protect them from possibility of contact with any other pollen. If fruits and seeds then develop we are confident that the seeds are cross-breeds.

About fifteen years ago we began crossing Wheats. While engaged in this way it occurred to me to make the attempt to hybridize Wheat and Rye. The result of pollenating many heads was ten seeds, nine of which germinated and wintered safely. Eight resembled Wheat in every way, and the plants scarcely differed from the mother, which was Armstrong, a beardless variety. The ninth plant was peculiar in having hairy culms and long, narrow heads, of which there were about twenty; and these twenty heads were so nearly sterile that they bore only a grain or so apiece. The other plants were all fertile, and several of them were again pollenated with Rye. It would take a long time to recount the suggestive, instructive history of these plants. I have now plants which by blood are fifteen-sixteenths Rye. These were nearly sterile, and all attempts to again cross with Rye have resulted in absolute sterility. Some of the fifteen-sixteenths Rye plants grow more fertile each year. Many of the three-fourths Rye plants are now fully fertile, and so well fixed that we are propagating them for introduction, while three of the half-breeds have already been introduced. Many of the hybrids bear very large kernels, long heads, with close spikelets. Some of them are as early as Rye, and perfectly hardy at my home. Thousands have been destroyed on account of their conspicuous worthlessness.

Some years ago Professor William Saunders, of Canada, told me he thought he had effected a cross between the Raspberry and the Blackberry. We made crosses the next season and every season since. The Raspberry alone was used as the mother plant the first year. Some of the seedlings were Raspberries in every way, some were Blackberries in every way, a few were intermediate. Whether an improved variety will come out of these remains to be seen. Thus far, all that have fruited produce imperfect berries; that is, berries with from one to a dozen drupelets; while others bloom but do not fruit at all. Professor Saunders' Hybrids were from some accident destroyed before fruiting.

We have never raised a Rose from any other seed than that borne by *Rosa rugosa*. This plant is very hardy, bearing leaves of exquisite beauty—thick, leathery, with a glossy, wrinkled surface. The flowers are large, single, and in color white or pink. As a pollen parent we used the first summer Harison's Yellow, and that alone. This is a very hardy Austrian Rose with small leaflets, bearing semi-double yellow flowers. Most of the seedlings died from mildew. Only about thirty survived. When it is considered that *R. rugosa* differs from all other Roses in such a marked way, one would naturally have supposed that its seedlings would be stamped with its peculiar characteristics rather than with those of the male parent, which may be said to resemble, in a general way, a hundred other Roses. Such was not the case. Most of the seedlings resembled the male parent in having small leaflets which were neither wrinkled nor of unusual thickness. The flowers were a yet greater surprise. All the single flowers are small, the colors being rosy white, pink, dark pink. There were neither yellow nor pure white flowers. One bush bears small single flowers, which are a feeble Rose color around the edges, then white and finally yellow about the base. Of the double flowers one bush bears pink flowers, which are as "double" as a Rose well can be. The leaflets show the Rugosa blood plainly. Three others bear Rugosa foliage. The flowers of two are semi-double, of the color of General Jacqueminot. The third, which during the past year has been propagated for introduction by a leading nursery firm, bears flowers identical in color with those of General Jacqueminot. The color is also the same. It is as nearly a perpetual bloomer as is the mother plant. The leaflets, while preserving much of the thick, wrinkly texture, are larger than those of *R. rugosa*. Would any one have prophesied that a yellow Rose crossed on a single pink Rose would have produced a plant so closely resembling General Jacqueminot?

The next year we used pollen from Hybrid Perpetuals, and the next, as well as the present, season from Yellow Teas chiefly. Of these none that have bloomed are yet worthy of remark; we have about 300 in all. The present season has been specially favorable to an abundant harvest of hybrid seed; probably we have no less than 3,000.

When the hardy and distinct characteristics of *Rosa rugosa* are considered, one would suppose that the children of such a rugged mother would be healthy and strong. The fact is, however, that nine-tenths die of mildew. It is worthy of remark, also, that not one seed in ten is viable. They are shells without embryo.

Finally, you have all heard of the Great Japan Wineberry. Though this is the old *Rubus phœnicolasius*, which has been in certain nurserymen's catalogues and in private collections for a dozen years, it is still a most remarkable Raspberry, worthy of a place in every collection. The forming berry is enclosed within the sepals, which are covered with purple viscid hairs, like the bud of a Moss Rose. This protects the fruit from worms, for all small insects are caught and held by the sticky exudation. As the berry ripens, the sepals fall back. The berry, at first a bright, diaphanous scarlet, turns, as it ripens, to a rich ruby color. The berries are juicy and of a refreshing, sprightly quality, with scarcely a trace of the peculiar Raspberry aroma. Upon this we have succeeded in crossing both the Blackberry and the Rose.

SPECIAL FERTILIZERS UNDER GLASS.

Professor S. T. Maynard, in a paper on this subject, began by saying that the three essential conditions for the successful growth of plants under glass are these: the proper amount of water, a temperature suited to their growth and an abundance of plant food. All of these conditions are necessary, and it is difficult to say whether one is more important than another; but the last condition, that of plant food for greenhouse crops, was alone to be discussed.

In making up the soil for greenhouse plants, whether grown in pots or beds, the principal ingredients are: turf, more or less decomposed, or garden soil, and stable manure either fresh or decomposed, according to the nature of the plants to be grown. With these materials properly put together, very successful results are generally obtained by the skillful gardener; but sometimes, either from poor quality of the manure used, from a poor mechanical condition or from improper treatment after being put into the beds or pots, plants fail to make the vigorous growth we desire. Then it is difficult to get enough plant food into the small space of the flower-pot or bench; a small amount of soil and root space being necessary to secure an abundance of bloom. In houses naturally moist we must use a small amount of soil to secure a healthful condition for the growth of the roots; and therefore we must find something to increase the food supply in the soil and to give the plants a start. This has led to the use of liquid made from stable manure. Green manure is placed on the surface of the bench or pots and plant food is washed into the soil by a liberal supply of water. Plants grow well under this practice, but the manure is offensive and requires a great amount of labor and care in its application. We believe that the necessary supply of plant food may be more easily and safely obtained from chemicals and special manures.

After the mechanical conditions have been made right, there is little danger of getting the soil too rich for the common commercial crops, if all the elements of plant food necessary for a complete and perfect growth for the purpose desired are present; that is, if a leaf growth is sought for, potash and the nitrogenous elements must be used, while if seed or flowers are desired, the use of phosphoric acid in the form of fine bone or bone black is recommended.

After the crop has been started, one of the best ways to furnish additional plant food is in a liquid form. The soluble chemicals, however, like the potash salts and the soluble nitrates, must be applied with care; for if the liquid is allowed to remain for a considerable length of time on the foliage it is liable to be seriously injured. The so-called flower-foods and the standard commercial fertilizers of various manufacturers have been very successfully used. For house plants, when the grower is not skilled in the preparation of soil for the perfect growth of plants, the flower-food gives excellent results.

Professor Maynard then gave the details of several comparative experiments in growing Carnations, Pansies, Lettuce and Cabbage plants under glass with various special fertilizers. It is not necessary to give these in full, although the complete tables in which the effect of the various fertilizers were used singly and in combination would be very instructive. The summary of the whole matter is given in Professor Maynard's own language as follows:

Summing up the results of these various experiments we come to the conclusion that, of the nitrates, the sulphate of ammonia gives the best results; that of the potash and soda

salts, the sulphate of potash has given by far the best results. Bone black, in view of these tests, must be given the first place in hastening the maturity of plant growth and in the production of seed, while the nitrate of soda seems to be injurious rather than beneficial. These, however, can be given only as the results of a comparatively limited series of tests; and all careful experimenters know how difficult it is to be sure that all the conditions are fully understood and how unsafe it is to draw conclusions from anything but a long series of experiments. But having taken every precaution to fully understand all the conditions and to make very careful and complete records, and as the results confirm the opinions of some of our best scientists, we feel warranted in recommending, as special fertilizers for greenhouse crops, sulphate of ammonia, sulphate of potash, ground bone and dissolved bone black.

The fact that the nitrate of soda has a tendency to absorb moisture is sufficient to account for the increased amount of mildew and the poor growth of the Lettuce in one plot in both experiments. Why the muriate and nitrate of potash have given no better results must be explained by one who is more of a chemist than I am.

Dried blood and other animal nitrogenous substances are very unsatisfactory in the greenhouse, because of the amount of moisture and animal life they produce in the process of decay.

Potash and other salts must be carefully used and only in small quantities at a time, as in the evaporation of the water from the soil the salts are deposited upon the surface, and, where the tender leaves come in contact with it, they may be seriously injured. Many a batch of seedlings and cuttings has been destroyed in this way, and conditions favorable for fungus growths produced in the tissues of the injured foliage.

Whatever may be your opinions of the results of these experiments, I wish to urge you to give them careful consideration, to repeat them, to verify them and to make other experiments, carefully recording all conditions and results, and to report them at future meetings or to your favorite paper. The value of any new method of cultivation or fertilization must be finally determined by the practical gardener, who is making his living by his labor; and he and the man of science should work together—the one making known his needs, and the other working, in the light of science, to present new truths and to make the practice more easy and profitable.

HELLEBORES FOR THE COMMERCIAL FLORIST.

William Falconer, of Glen Cove, Long Island, read the paper which follows on this subject:

We have two sets of Hellebores—namely, Christmas Roses and Lenten Roses. The Christmas Rose (*Helleborus niger*) and its varieties bear large white flowers in November and December. The Lenten Roses are represented by *Helleborus Olympicus, H. Colchicus* and *H. orientalis*. They have purple flowers, while some of their varieties and hybrids have white, purple and spotted flowers, and they come into bloom between January and April.

Christmas Roses are useful as cut flowers, and in pots, if in bloom, they are excellent for house decoration. The Lenten Roses are only useful as pot plants; but both would be classified as "fancy" rather than as staple articles. Florists who have a good local trade can use Hellebores to advantage, but it would be hardly advisable for florists who grow flowers for the wholesale market to handle them.

For cut flowers *Helleborus niger maximus* is the best, but the blossoms must be cut just as wanted for use, for they have no great lasting qualities. One of our leading Boston florists who has handled these flowers writes: "I am a little in doubt about their value as cut flowers. Those I had last winter did not come up to my expectations in keeping qualities, being inclined to hang and droop their heads too much. As pot plants they will give much better satisfaction. The demand at first will be limited and it will grow slowly; still the flower is one that it will pay to grow as a desirable novelty." A New York florist writes: "There is no doubt that *Helleborus niger maximus* and the larger-flowered varieties of *H. niger* would be profitable for cut flowers if large established plants were planted out in a cool greenhouse or a well protected cold frame. The great difficulty, however, lies in the first cost of these large plants, and secondly, in the fact that, as a rule, a florist wants to get immediate return for his investment, and will not wait four or five years or until his plants become large enough to produce an abundance of blooms."

My own opinion of these Christmas Roses is that they are a most welcome addition to our cut flowers, and particularly valuable as they come in at a time when variety as well as quantity is somewhat limited.

As pot plants the Lenten Roses are very desirable, but they need to be strong plants and well grown. Neither the Christmas Roses nor Lenten Roses can be grown profitably as outdoor hardy perennials. They need cool greenhouses or frames. The Christmas Roses should be planted out permanently, and for this reason I prefer growing them in cold frames. As the Lenten Roses are pot plants they may be plunged outside in cold frames in summer, and brought indoors in winter, or, if wanted for late work, kept out in the frame till they show signs of blooming, and then brought indoors. They all prefer a well drained loamy soil, with a loose surface and a somewhat shady place in summer. A frame up against a north or north-west facing wall of a building is a good place for them; or they can be grown under a high-raised lath or brush-shading, such as is used over forest-tree seed-beds. The ground about them should be mulched with half-rotted leaves and finely chopped sphagnum moss, and this keeps it cool, loose and moist all summer.

A Baltimore delegate explained the workings of a florists' exchange in that city which was organized last year under the State laws, and is governed by seven directors—four growers and three dealers. The prices are set by the officials of the exchange, unsold flowers are destroyed and the losses are borne by the exchange members in proportion to the amount of stock they hold. The commission the exchange makes pays the salary of the manager and necessary expenses. The system is said to work well and to give an opportunity for growers to dispose of small lots which a commission merchant would hardly care to be troubled with.

In response to the inquiry "What twenty native plants are the best for florists' use," Mr. A. Gilchrist, of Toronto, Ontario, submitted the following list: *Trillium grandiflorum, Cypripedium spectabile, C. parviflorum, C. pubescens, Asclepias tuberosa, A. incarnata, Euphorbia corollata, Coreopsis lanceolata, Helianthus strumosus, Spiræa lobata, Nymphæa odorata, Thalictrum Cornuti, Rudbeckia laciniata, Rudbeckia hirta, Eupatorium ageratoides, Solidago Canadensis, Aquilegia Canadensis, Lobelia cardinalis, Monarda didyma.*

In reply to the question, What are the twelve best hardy shrubs for florists' use? Mr. Jackson Dawson gave the following list as the best among those that are rarely or never forced for market: *Andromeda speciosa, Cytisus scoparius, Viburnum plicatum; Staphylea Colchica, Deutzia Sieboldii, Exochorda grandiflora, Pyrus baccata floribunda, Rubus rosiflorus, fl. pl., Weigela candidissima, Philadelphus latifolius, Spiræa Cantoniensis, fl. pl., Kalmia latifolia.*

The following officers were elected for the ensuing year: President, M. H. Norton, Boston; Vice-President, John Chambers, Toronto; Secretary, W. J. Stewart, Boston; Treasurer, M. A. Hunt, Terre Haute, Indiana. It was voted to hold the next annual meeting at Toronto.

Exhibitions.

The Horticultural Show at Boston.

THE annual exhibition of the Massachusetts Horticultural Society, held while the Convention of the Society of American Florists was in session, was conspicuously good in all its details, and was considered by many of those whose judgment is of value in such matters as the best display of the kind which has been seen in this country for years. The exhibition was held in the large Music Hall, and yet the collections occupied so much of the floor space, including stage and galleries, that the throng of visitors had extreme difficulty in moving about without injuring the specimens which skirted the various groups, and even then it was found necessary to pack many of the plants so closely together that large numbers of the very finest of them could not be seen to good advantage.

The exhibition began outside the doorway with a collection of conifers, containing fifty-six species and varieties, from Mr. J. W. Manning, and with similar groups within the vestibule from the Messrs. Temple & Beard and Wm. C. Strong. Some fine specimens of Hydrangea with blue flowers, from Mr. John L. Gardiner, added interest to these outside groups. The view from the stage was almost bewildering. The ample balustrades in front of the balconies were festooned with greenery, with large specimens of Nepenthes hanging beneath. Masses of cut flowers made a brilliant appearance in the lower balcony, while in room-like apartments below the balcony and opposite the stage were a number of elegant table and mantle decorations. Under the shade of some immense Palms in the centre of the room was a blaze of bloom from gorgeous

aquatics, while all around the main floor were groups of plants from the best known collections in the vicinity of Boston. In the centre of the stage was a magnificently colored specimen of the Croton, Queen Victoria, exhibited by Mr. George A. Nickerson, of Dedham. Behind it were tasteful groups of foliage plants from the establishments of Mr. F. Becker and Mr. W. E. Doyle, of Cambridge, while about the great Croton were some remarkable plants, among them the highly decorative *Dasylirion acrotrichum* and large specimens of Alamanda and Agapanthus, and some magnificent Fuchsias, including a fine plant of the variety Gloria, well known forty years ago, but now rarely seen here.

Our limits of space will only permit a mention of some of the most meritorious of the plants in the various collections upon the floor, and no doubt among the great number of those represented many good specimens escaped attention altogether. The first group to demand attention was that from the Botanic Garden of Harvard University, which contained excellent specimens of *Gymnogramme calomelanos, G. Tartarica, Sanseveria Zeylanica, Peperomia arifolia,* with choice Adiantums, Selaginellas and Marantas.

Adjoining this was the extensive rich collection of Mr. Nathaniel T. Kidder, including such well-grown specimens of *Cycas revoluta* and *Araucaria excelsa* as are rarely seen. A large plant of *Davallia Mooreana* was greatly admired, as was one of *Cyanophyllum magnificum* and another of *Spherogyne latifolia*. Here also was a fine specimen of *Phyllotænium Lindeni* —a plant whose popularity is evidently on the increase, since it occurred in no less than six other collections.

In the large group furnished by Mr. John L. Gardiner, and arranged with great taste by Mr. Atkinson, were splendid examples of *Gymnogramme schizophylla, Adiantum Farleyense,* with remarkable Marantas and Pandanads.

Noteworthy in the large assortment from the gardens of Mr. H. H. Hunnewell were: *Ficus Parcellii, Cissus discolor, Croton pictum, Dracæna indivisa, fol. var.* (a particularly elegant variety) and *Davallia Fijiensis.*

The collection of Mr. F. L. Ames was so notably good throughout that it is difficult to single out one specimen for special mention, but *Lomaria gibba, Platycerium Hillii, Anthurium Waroqueanum, Croton Mortii, Dieffenbachia Bausei* and *Anthurium Veitchii* seemed particularly interesting.

Some grand plants were shown by Mrs. J. Lassell, of Whitinsville, Massachusetts. Specially noticeable were the specimens of *Heliconia aurea striata,* a grand plant for decoration, and one which must soon come into general use, *Alocasia* species, *Dracæna Youngii,* and *Gleichenia Mendeli,* a plant of splendid proportions. Two specimens of *Peristeria elata* attracted much attention, and they were worthy of it, for one of them bore no fewer than twelve spikes, one of which had seventeen fully developed flowers and as many more partially developed.

Specimens of *Phœnix rupicola* and *Kentia Belmoreana,* shown by Mr. George A. Nickerson, were among the noblest plants in the whole exhibition.

Some fine Orchids were contributed by Messrs. Siebrecht & Wadley, of New York, and the collection of Mr. Ames was exceedingly rich and varied, containing a great portion of the best plants in bloom at this season. It would be difficult to find better plants of *Lælia crispa superba, L. elegans Littleana, L. callistoglossa, Cypripedium Morganiæ, C. ænanthum, C. bellatulum, Odontoglossum grande* and *Cattleya Eldorado.*

Among miscellaneous plants the Harvard Botanic Garden contributed collections of Cacti, with economic and interesting plants; Mr. Smith, of the Washington Botanic Garden, a large collection of carniverous plants; Mr. R. H. White, a flowering specimen of *Monstera delicosa;* Mr. Benjamin Gray, specimens of the Papyrus, and Mr. David Allen, a remarkable group of Anthuriums. Among the aquatics the cluster of Egyptian Lotus from Mr. Sturtevant's famous pond in New Jersey attracted much attention. Mr. L. W. Goodell had a most complete and beautiful collection. It contained specimens of twenty-five highly desirable water plants, with the information that they were all hardy.

Among the principal awards made were the following: Mr. H. H. Hunnewell received the first prize for Palms, for greenhouse plants, for Caladiums and for Dracænas; Mr. N. T. Kidder, for Ornamental-leaved plants, Ferns, Adiantums, Lycopods and Crotons; Mr. F. L. Ames, for Orchids, for the best single Orchid (*Lælia crispa*), for specimen ornamental-leaved plant and Nepenthes; Mr. John L. Gardiner, for greenhouse plants and Nepenthes; Dr. C. G. Weld, of Brookline, for specimen Tree-Fern, Crotons and Gloxinias; Temple & Beard, for coniferous trees and hardy herbaceous flowers; Mr. O. A. Ruggles, for the best floral design; Mr. David Allen, for the best mantel-piece decoration; Mr. L. W. Goodell, for aquatic plants and flowers. A silver medal was awarded to Geo. A. Nickerson, for the Croton Queen Victoria, and one to G. McWilliams, for a remarkable Alocasia.

Notes.

The journal of the Japanese Horticultural Society states that the exports of plants, trees and shrubs from Japan during the month of January last amounted in value to very nearly $6,000.

A sketch of the life of Reichenbach, the great authority on Orchids, written by his executor, Dr. Dilling, and originally printed in a periodical, has recently been issued in pamphlet form by Lucas Graefe, of Hamburg.

In a recent number of the *Revue Horticole* Monsieur Charles Naudin states that about eighty species or well-marked varieties of Eucalyptus are now growing in the gardens of the Villa Thuret at Antibes, while several additional species may be found in adjacent localities.

The *Revue Horticole* names as "the horticultural marvel of the year 1890" a new Wistaria (*W. multijuga*), which has bloomed in abundance in the gardens of Monsieur Bertin at Versailles. "Although introduced long ago," adds the *Revue*, "it is hardly known even to botanists, and has been almost impossible to find." It greatly resembles the ordinary Chinese Wistaria, but nevertheless differs from it in ways which the *Revue* promises to explain with fullness at a future time. Meanwhile it is noted that its flower-clusters measure from thirty to forty inches in length.

The American Association of Cemetery Superintendents held its annual meeting in Boston while the Florists' Convention was in session. More than sixty members were present from all parts of the country, and the papers and discussions, which related to all parts of the management of cemeteries, were unusually interesting. The discussions seemed to show that public taste is tending toward a limitation of stone-work, and a stronger reliance upon planting, for general effect. The use of hedges, coping and other conspicuous separations between lots was pretty generally discountenanced, and opinion favored an open, natural treatment of burial-grounds rather than the more rigid and architectural method which once prevailed in cemeteries, and which has its most conspicuous representative now in Greenwood. Mr. John G. Barker, Superintendent of Forest Hills Cemetery, was elected President for next year; R. D. Cleveland, of Lakewood Cemetery, Minneapolis, Vice-President, and Frank Higgins, of Woodmere Cemetery, Detroit, was made Secretary and Treasurer. Mr. O. C. Simonds, of Chicago, was elected Chairman of the Executive Committee. Instructive papers were read by William Solway, of Cincinnati, on "What Trees to Plant and When to Plant Them"; by Mr. O. C. Simonds, of Chicago, on "Shrubs and Trees"; Mr. A. W. Blaine, of Detroit, on "Mistakes in Cemetery Management"; Mr. George Troup, of Buffalo, on "Cemetery Roadways," and Mr. Frank Eurich, of Toledo, on the "Life and Service of Adolph Strauch," the originator of the so-called Lawn System in cemetery design and management.

Experiments in spraying Peach-trees for the Curculio with London Purple resulted last year, especially in the Peach-region of Michigan, in great injury to the foliage, so that Professor Cook in a station bulletin declared that the foliage of the Peach-tree is especially susceptible to injury, and that London Purple is more injurious than Paris Green, owing to the fact, no doubt, that the soluble arsenic is abundant in London Purple and almost absent in Paris Green. Experiments at Cornell made for two seasons seem to corroborate this view, and from a recent bulletin by Professor Bailey it appears, without going into details, that leaves sprayed by London Purple were found to contain arsenic in the texture of the leaves, while those injured by Paris Green showed none. The poison in the latter case simply affected the surface of the leaf. Undoubtedly the injury is caused by the fact that over fifty per cent. of the arsenite of calcium in London Purple is soluble in water, and is thus carried into the body of the foliage. Young leaves are proved to be less liable to injury than full grown ones, which is due, it is supposed, to the waxy covering so abundant on recent leaves and shoots. Microscopic examination shows that the Peach-leaf is a very delicate structure, the epidermis being remarkably narrow and the cell-walls thin. This delicacy of structure seems to account for the greater susceptibility of the Peach-leaf to injury than the leaves of the Plum and other trees. A mixture of one pound of Paris Green to 300 gallons of water, when applied in a fine spray, did not injure the Peach-trees. Probably one pound to 350 gallons would be always safe.